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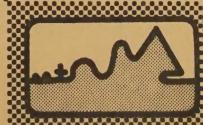
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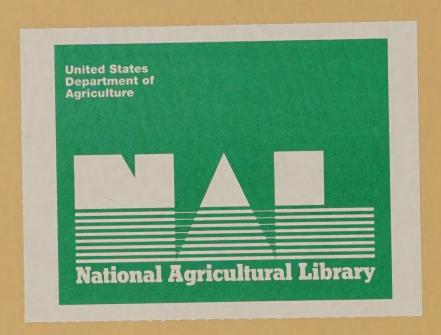
SAWOOTH, WHITE CLOUD

BOULDER AND PIONEER MOUNTAINS

Edward F. Schlatterer

U. S. DEPT AGRICULTURE · FOREST SERVICE · INTERMOUNTAIN REGION





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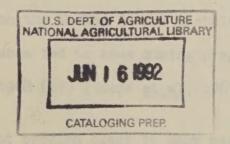
PLANTS AND MINERAL ELEMENTS FOUND IN THE SAWTOOTH, WHITE CLOUD, BOULDER, AND PIONEER MOUNTAINS

by

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U. S. D. A. - Forest Service - Intermountain Region

March 1972



DESCRIPTION AND PERSONS

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Plants and mineral elements found in the Sawtooth, White Cloud, Boulder, and Pioneer Mountains that are potentially hazardous to livestock or human health.

A. Problem Plants

Over sixty plants found on the area are potentially hazardous to livestock and a number to human health as well (Table 1). Plants belonging to five genera, Astragalus, Delphinium, Lupinus, Oxytropis, and Veratrum have produced known losses of both cattle and sheep, particularly on the Mackay Ranger District of the Challis National Forest. The effects of the toxic properties of these plants have been studied by Dr. Shupe and his associates at Utah State University (see literature cited).

Species of <u>Astragalus</u> and <u>Oxytropis</u> were found to produce abortions and malformations in offspring when ingested by cattle or sheep during pregnancy (James <u>et al</u>, 1967).

Laboratory work with plants collected from the Mackay Ranger District showed that species of <u>Lupinus</u> could produce death in sheep and marked signs of poisoning in cattle (James <u>et al</u>, 1968). Further field experiments in Muldoon Canyon on the Mackay Ranger District showed that <u>Lupinus</u> produced crooked calves when fed to cows during pregnancy (Shupe <u>et al</u>, 1967 (b)) (Shupe <u>et al</u>, 1968 (b)) (Shupe <u>et al</u>, 1967 (a)).

Delphinium is an important problem plant in many parts of the area particularly the Mackay Ranger District. Cattle losses severely affect the management of cattle on this area. Some work has been done testing the plants on the Mackay District and using them for experimental work (Shupe et al, 1967 (b)) (Shupe et al, 1968 (a)).

Plants and mineral elements found in the Sautoctic Write Close, Boalder, and Florest November to Mysettock or human beatth.

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interesting week with plants could produce death in cheef and mark of stone or not senting in outsile (James et al. 1968). Therefore first appeals and the interest of the int

<u>Veratrum californicum</u> is found in some abundance in Muldoon Canyon on the Mackay Ranger District. When this plant is ingested between the first to the fifteenth day of gestation by sheep, cyclopian-type deformities occur in the lambs. If feeding on <u>Veratrum</u> is continued beyond the fifteenth day of gestation, a much higher than normal number of ewes abort their lambs. Field studies to determine these data were conducted on the Mackay Ranger District by Binns <u>et al</u> (1963).

B. Ergot

The common name "ergot" refers to the fruiting body of various species of the fungus, genus <u>Claviceps</u>, formed in the heads of a number of species of wild and cultivated grains and grasses. This fungus has a history going back to ancient times of fatally poisoning humans and animals. Human poisoning has generally occurred due to the use of infected grain in the manufacture of flour, particularly rye flour. Stock loss is generally due to the ingestion of infected grass, grain, or hay. Incidence of infected grasses is confined mainly to stream bottoms since infection is favored by moist conditions.

"Ergot" was found on Great Basin Wild Rye grass on the Challis National Forest.

I visualize no particular hazard to humans visiting areas in which infected grasses are present. However, should horses or other stock be tied or confined in areas containing infected grass, then poisoning of these animals is possible.

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The course name "erest" refers to the fruithing body of various species of the frugue, seems Clarifyer, formed in the house of a rober of species of vill and unictivated grains and grasses. This langue has a history going back to amories times of habity potentially potentially beamed and actually between my harmon and actually in the resultances of flows, particularly specially the time of infected grain alignments of flows, particularly special, or may. Incidence of infection of infection of infection of infection of the settern bottoms arms indention is

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relegances are present. However, should horsen or other arook be that or command in areas containing inferted grain, then princeted or these animals to present.

C. Other Plants

Many plants are capable of producing allergic reactions in humans. Such plants, while annoying, are not normally considered to be dangerous.

D. Problem Mineral Elements and Compounds

Selenium

Stanleya pinnata, a plant which requires Selenium for proper growth, was found in Taylor Canyon on the Mackay Ranger District.

This canyon is on the Wood River Geologic Formation. It is likely that this geologic formation found commonly in the southern half of the area contains Selenium throughout. A number of species capable of accumulating Selenium are found on the area (Table 1). While no livestock losses from Selenium are known on the area, a problem could develop.

Nitrates

A number of species found on the area (Table 1) have been found to contain toxic concentrations of nitrates under some conditions (Kingsbury, 1964).

No livestock losses due to nitrate poisoning are known for the area.

Molybdenum

Molybdenum is a common element on the area although it rarely occurs in quantity at the ground surface.

Kingsbury (1964) cites two ways in which molybdenum may produce a toxic effect in livestock. "Abnormally low molybdenum in soils of normal copper content supports forage which promotes copper accumulation in animals and eventually development of symptoms of copper poisoning -- even death.

Abnormally high molybdenum in soils of normal copper content results in forage which depletes the copper reserves of animals over a period of time

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and results in development of symptoms of copper deficiency. Soils of moderate molybdenum content but low copper content do likewise." Diet of the animals, and especially inorganic sulfate content of the forage, influences the toxic effect.

In light of the deposits of molybdenum found on the area, this element is one that might be monitored at strategic locations.

Tailings produced in extracting this mineral, settling ponds, and other effluents from a mining operation could produce higher than normal molybdenum concentrations in the soil and vegetation. Kingsbury (1964) states that leguminous plants accumulate molybdenum to some degree. Species of this group of plants would be more sensitive to increases in the molybdenum levels and would be useful for monitoring. No livestock losses due to molybdenum poisoning are known for the area.

Copper

Copper is found at various points in the area, and a few mines exist.

Copper is capable of producing toxicity in livestock. Molybdenum and copper are antagonistic in animal nutrition as stated above.

No livestock losses due to copper poisoning are known for the area.

Fluorine

At least one hot spring in the Warm Springs drainage of the Ketchum Ranger Districtis known to contain high amounts of fluoride (12.5 ppm) in the water. Vegetation from the area surrounding this hot spring also contains high amounts of fluoride (16 to 92 ppm).

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Shupe (1970) indicates for dairy cattle that acute fluorosis results when the diet contains over 250 ppm fluoride. Chronic fluorosis ranging from borderline to severe occurs when dairy cattle are fed 30 to 109 ppm fluoride in the diet.

Elk from the Wakefield Spring in the Warm Springs Drainage have been examined, and some have exhibited symptoms of chronic fluorosis. The effect of this disease on the elk population utilizing the winter range area adjacent to the spring is unknown.

Hot springs occur throughout the area and may be a source of fluorine contamination of vegetation and water. Careful monitoring should be considered at strategic locations to protect animal and human health.

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TABLE 1

Potentially Toxic Plants and Plant Groups Found on the Sawtooth, White Cloud, Boulder, Pioneer Mountains

Plant Species

Forbs	Toxic Principal	Known to be
TO TO THE PARTY OF	TOXIC FIINCIPAL	toxic to -
Achillea millefolium	Alkaloid	Cattle
Actaea rubra	Essential oil	Humans & livestock
Allium spp.	Alkaloid	Livestock
Amaranthus retroflexus	Toxic concentration of nitrates measured	Livestock
Amsinckia sp.	Toxic concentration of nitrates measured	Livestock
Anthemis spp.	Unknown	Poultry
Aster spp.	Some sop. secondary selenium accumulation	Livestock
Astragalus spp.	Some spp. are selenium indicators; some are	
	secondary selenium accumulators	Livestock
A. convallarius	Alkaloidal	Livestock (loco)
A. spp.	Alkaloidal	(abortion)(loco)
Caltha spo.	Anemonin - protoanemonin	Man & livestock
Castilleja spp.	Some spp. are secondary selenium accumulators	Livestock
Chenopodium spp.	Oxalates & antihelminthic oil	Man & livestock
C. spp.	Toxic concentration of nitrates measured	Man & livestock
C. album	Toxic concentration of nitrates measured	Man & livestock
Cirsium arvense	Toxic concentration of nitrates measured	Livestock
Clematis spp.	Alkaloidal, glycosidal& saponic factors	
	protoanemonin	Livestock
Conyza sp.	Unknown	Sheep
Corydalis aurea	Alkaloids	Livestock
*Delphinium spp.	Alkaloids	Cattle-minor sheep
*D. depaureratum	Alkaloids	Cattle-minor sheep
*D. barbeyi	Alkaloids	Cattle-minor sheep
Descurainia sp.	Unknown	Cattle
Equisetum spp.	Thiaminase and alkaloids	Livestock
E. arvense	Thiaminase and alkaloids	Livestock
Fritillaria sp.	Alkaloids	Human?
Grindelia squarrosa	Secondary selenium accumulator	Livestock
Haplopappus spp.	Toxic conc. of nitrates measured - alcohol	
	tremetol conc. in some spp.	Livestock
Helianthus anuus	Toxic concentration of nitrates measured	Livestock
. Hymenoxys spp.	Unknown	Livestock
Hyoscyamus niger	Alkaloids	Man & livestock
Iris missouriensis	Unknown	Livestock
Lactuca serriola	Unknown - toxic conc. of nitrates measured	Cattle
Linum lewisii	Cyanogenetic glycoside	Livestock
*Lupinus sericeus	Alkaloids	Livestock
Macacranthera sp.	Secondary selenium accumulators	Livestock
*Oxytropis sericea	Alkaloids	Livestock (loco)
*Oxytropis sericea	Alkaloids	Abortion sheep-cattle
Penstemon sp.	Secondary selenium accumulators	Livestock
Polygonum sp.	Toxic concentration of nitrates measured	Livestock
		Livestock
.Polygonum sp.	Unknown - photosensitization	TIT 4 CO COCK

^{*}Plants and plant groups which have caused known livestock losses on the study area.

Plant Species

			VIIOMIT TO DE
Forbs (Cont	.) Toxic Principal		toxic to -
Ranunculus sp.	Protoanemonin		Livestock
Rumex sp.	Oxalates - toxic conc. of nitrates mea	asured	Livestock
Salsola kali	Oxalates - toxic conc. of nitrates mea		Livestock
Senecio spp.	Alkaloids		Man & livestock
S. integerrimus	Alkaloids		Man & livestock
Solidago spp.	Unknown		Sheep
Solidago spp.	Toxic concentration of nitrates measur	red	Livestock
Stanleya pinnata	Obligate selenium indicator plant		Livestock
Stellaria sp.	Toxic concentration of nitrates measured		Livestock
Thlaspi arvense	Mustard oils - isothiocyanates		Livestock
Trifolium pratense	Alsike - photosensitization		Livestock
T. spp.	Alsike - photosensitization		Livestock
Urtica sp.	Toxic concentration of nitrates measur	red	Livestock
*Veratrum californicum	Alkaloids		Sheep
Zigadenus elegans	Alkaloids		Man & livestock
Z. paniculatus	Alkaloids		Man & livestock
Grasses			
Agropyron spp.	Fruiting body of fungus Claviceps		Man & livestock
Agrostis alba	Attacks seedheads of some grasses		Man & livestock
Bromus inermis	(Alkaloids produced) "Ergot"		Man & livestock
Calamagrosits spp.			Men & livestock
Elymus spo.			Man & livestock
Elymus cinereus			Man & livestock
Poa spp.			Man & livestock
Festuca spp.	Alkaloids produced in nonheaded plants	5	
	by fungus		Man & livestock
Glyceria striata	Cyanogenetic potential		Cattle
Trees & Shrubs			
Artemisia spp.	Volatile oils (large amounts)		Livestock
Atriplex spp.	Some species secondary selenium accum	lators	Livestock
Cercocarpus so.	Cyanogenetic potential		Livestock
Chrysothamnus nauseosus			Livestock
Gravia sp.	Secondary selenium accumulators		Livestock
Haplopappus spp.	Toxic concentration of nitrates measur	red in	
***	some spp.		Livestock
Haplopaprus spp. ,	Alcohol tremetol (in some species)		Livestock
Juniperus sp.	Unknown		Livestock
Kalmia polifolia	Toxic resinoids		Man & livestock
Ledum glandulosum	Toxic resinoids		Man & livestock
Pinus ponderosa	Unknown		Still birth-cattle
Prunus virginiana	Cyanogenetic glycosides .		Man & livestock
Sambucus en.	Unknown		Man & livestock
Tetradymia canescens	Unknown - photosensitization		Sheep
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Known to be

Above taken from Kingsbury (1964).

^{*}Plants and plant groups which have caused known livestock losses on the study area.

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